SYSTEMS AND METHODS FOR USING TEXTURES IN GRAPHICAL USER INTERFACE WIDGETS

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This patent application claims priority to U.S. Provisional Patent Application No. 61/159,482, entitled "Locating Features Using a Friction Display," filed Mar. 12, 2009, which is incorporated by reference herein in its entirety.

[0002] This patent application claims priority to: U.S. Provisional Patent Application No. 61/262,041, entitled "System and Method for Increasing Haptic Bandwidth in an Electronic Device," filed Nov. 17, 2009, which is incorporated by reference herein in its entirety.

[0003] This patent application claims priority to U.S. Provisional Patent Application No. 61/262,038, entitled "Friction Rotary Device for Haptic Feedback," filed Nov. 17, 2009, which is incorporated by reference herein in its entirety.

[0004] This patent application is related to U.S. patent application Ser. No. _____, filed the same day as the present application and entitled "Systems and Methods for a Texture Engine," (Attorney Docket No. IMM354 (51851-383720)), which is incorporated by reference herein in its entirety.

[0005] This patent application is related to U.S. patent application Ser. No. _____, filed the same day as the present application and entitled "Systems and Methods for Using Multiple Actuators to Realize Textures," (Attorney Docket No. IMM355 (51851-383719)), which is incorporated by reference herein in its entirety.

[0006] This patent application is related to U.S. patent application Ser. No. _____, filed the same day as the present application and entitled "Systems and Methods for Providing Features in a Friction Display," (Attorney Docket No. IMM357 (51851-383714)), which is incorporated by reference herein in its entirety.

[0007] This patent application is related to U.S. patent application Ser. No. _____, filed the same day as the present application and entitled "Systems and Methods for Friction Displays and Additional Haptic Effects," (Attorney Docket No. IMM358 (51851-383716)), which is incorporated by reference herein in its entirety.

[0008] This patent application is related to U.S. patent application Ser. No. _____, filed the same day as the present application and entitled "Systems and Methods for Interfaces Featuring Surface-Based Haptic Effects," (Attorney Docket No. IMM359 (51851-383715)), which is incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

[0009] The present invention generally relates to haptic feedback and more particularly to systems and methods for using textures in graphical user interface widgets.

BACKGROUND

[0010] Over the past several years, the use of devices that incorporate touch-screens and haptic feedback has grown exponentially. These devices are used as portable organizers, telephones, music players, and gaming systems. As haptic technology improves, devices may incorporate haptic effects configured to simulate textures. Accordingly, systems and methods for using textures in graphical user interface widgets are needed.

SUMMARY

[0011] Embodiments of the present invention provide systems and methods for using textures in graphical user interface widgets. For example, in one embodiment, a system for using textures in graphical user interface widgets comprises: an actuator configured to receive a haptic signal and output a haptic effect based at least in part on the haptic signal, the haptic effect configured to simulate a texture; a touch-sensitive interface configured to detect a user interaction and output a interface signal; and a processor in communication with the actuator and the touch-sensitive interface, the processor configured to: receive the interface signal; receive a display signal comprising a plurality of pixels defining a display area; determine a first texture associated with a first group of pixels defining a first section of the display area; determine a second texture associated with a second group of pixels defining a second section of the display area; and transmit a haptic signal configured to cause the actuator to: output a first haptic effect configured to simulate the first texture if the user interaction is associated with the first section of the display area, and output a second haptic effect configured to simulate the second texture if the user interaction is associated with the second section of the display area.

[0012] These illustrative embodiments are mentioned not to limit or define the invention, but rather to provide examples to aid understanding thereof. Illustrative embodiments are discussed in the Detailed Description, which provides further description of the invention. Advantages offered by various embodiments of this invention may be further understood by examining this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These and other features, aspects, and advantages of the present invention are better understood when the following Detailed Description is read with reference to the accompanying drawings, wherein:

[0014] FIG. **1** is a block diagram of a system for using textures in graphical user interface widgets according to one embodiment of the present invention;

[0015] FIG. **2** is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention;

[0016] FIG. **3***b* is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention;

[0017] FIG. **4** is a flowchart for a method for using textures in graphical user interface widgets according to one embodiment of the present invention;

[0018] FIG. **5** is an illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention;

[0019] FIG. **6** is another illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention;

[0020] FIG. **7** is another illustration of a system for using textures in graphical user interface widgets according to one embodiment of the present invention;